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ABSTRACT

The four papers in this collection report on geography and map libraries: (1) "Changing Patterns of Map Availability" (C. R. Perkins and R. B. Parry, United Kingdom), which presents the results of a three year survey into the state of world mapping, a discussion of the implications of changing patterns of map availability for map library acquisitions, an evaluation of worldwide availability of conventionally published mapping, and a statement of conclusions regarding this availability; (2) "L'automatisation au Departement des Cartes et Plans de la Bibliotheque nationale (Automation in the Department of Charts and Maps in the National Library)" (Pierre-Yves Duchemin, France), which appears only in the original French; (3) "Online Bibliographic and Circulation Systems: The Illinois Example" (David Cobb, United States), which discusses the recataloging project of the University of Illinois Map and Geography Library, supported by a Title II-C grant; and (4) "CARTO-NET: Graphic Retrieval and Management in an Automated Map Library" (Barbara Morris, United Kingdom), which provides descriptions of CARTO-NET, a fully functioning, automated map cataloging and retrieval system, and a study of the feasibility of setting up a cooperative map cataloging network. (CGD)

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Division of Special Libraries

SECTION OF GEOGRAPHY AND MAP LIBRARIES

Sessions: 110 Tuesday 13.00 – 14.30
119 Tuesday 15.00 – 16.00

Changing patterns of map availability *(121-GEO-3-E)*	C R Perkins University of Manchester R B Parry University of Reading UK
L'automatisation au Département des Cartes et Plans de la Bibliothèque nationale *(124-GEO-4-F)*	Pierre-Yves Duchemin Bibliothèque nationale Paris France
Online bibliographic and circulation systems: the Illinois example *(42-GEO-1-E)*	David A Cobb University of Illinois Urbana IL USA
CARTO-NET: graphic retrieval and management in an automated map library*(58-GEO-2-E)*	Barbara Morris University of Edinburgh Scotland UK

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CHANGING PATTERNS OF MAP AVAILABILITY

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and
R B Parry, *Map Curator, Department of Geography, University of Reading, UK*

ABSTRACT

Parallel to the increasing amount of digital mapping there has been a vast increase in printed conventional map publication. This paper presents the results of a 3 year survey into the state of world mapping and discusses the implications of changing patterns of map availability for map library acquisition. Other surveys have sought to quantify topographic map publication but have not assessed the complexity of different degrees of availability. They have also disregarded the increasing amount of thematic mapping. This paper evaluates worldwide availability of all kinds of conventionally published mapping and concludes that inequalities in map availability are increasing, both in terms of area coverage, but also in terms of relative potential acquisition by collections.

During the late 1960s and early 1970s when the computer was first being used to assist in conventional map production several commentators speculated that digital mapping might eventually come to replace printed conventional map production.[1] Yet despite the rapid dissemination of digital technology and the increasing use of remotely sensed imagery for resource surveys even in 1985 it was "too soon to forecast the demise of the paper map".[2] Indeed evidence suggests that more printed maps are being published now than in the past. The new technologies have been used to create new digital products but mainly to assist in the publication of conventional mapping. The growth of output has been particularly noticeable in western countries.[3] Meanwhile an increasing variety of organizations are publishing mapping , in the public and private sector, civilian and military, concerned with presenting many different kinds of data at a wide variety of scales or levels of resolution. This profusion, particularly of thematic and specialised environmental mapping shows few signs of diminishing. Yet despite this increasing volume of material other commentators have noted that it is becoming increasingly difficult to acquire mapping, especially from third world countries.[4] This paper attempts to document the nature of these publication and availability trends, to explain them and to discuss the implications for the map library community.

THE LITERATURE ON PUBLICATION AND AVAILABILITY

The two best sources on map publication and availability are two chapters in World Mapping Today – Parry on publication trends and Perkins on acquisition and availability.[5] The next section is essentially a distilation of these works.

Probably 70% of published mapping in the world is issued as general purpose topographic series.[6] Most of the literature on development and publication trends of world mapping has been preoccupied with such general purpose maps and the UN has sponsored regular worldwide surveys to evaluate the worldwide state of topographic coverage. Questionnaire surveys were carried out in 1968, 1974, 1980 and 1986 and the results tabulated in issues of *World Cartography*. The last two surveys also considered the state of cadastral mapping. Numerous critical analyses of these data collection exercises have been carried out.[7] the ICA has also sponsored a worldwide country by country summary of the state of world topographic mapping.[8] Carré's analysis is rather different from the others because of its wider remit.[9] In addition to quantifying and mapping topographic coverage he attempts to quantify the state of more specialized mapping and provide an overview of geological map publication. There have been few attempts to quantify the state of other kinds of map coverage, though general works documenting the state of particular categories of mapping or discussing their acquisition have been compiled.[10]

Of all these critical analyses only Carré even begins to address questions of map availability. None of the others surveys discusses availability and the literature of map librarianship is also rather unhelpful when it comes to practical methods of acquiring mapping and the reasons for unavailability of material. Yet "one simply cannot obtain a map just because it has been published"[11] and questions of availability as well as publication are of fundamental importance to any map librarian.

It would be useful for the map librarian to have both critical surveys of map availability and authoritative and regularly revised listings of in print mapping. Sadly neither was until recently in existence.

There have been attempts to analyse the problems: Lock provided a general worldwide survey the whole field, but her work is very dated.[12] Larsgaard attempted to describe topographic mapping and its evolution for every country in the Americas and Australasia.[13] Other more specific articles discuss availability of different categories of map. Some consider the mapping of different areas eg Parry for Britain, Gardini for Brazil or Cobb for Western Europe. [14] Others examine availability of different types of thematic map.[15]

Comparative analysis of map jobbers listings gives the best guide to what is or is not available: thus one can compare the maps listed in Winch to get an idea of map availability in the early 1970s, with the maps listed in GeoKatalog for a more contemporary picture.[16] Jobbers listings often however omit useful information (eg publisher in the case of GeoKatalog) and different parts of GeoKatalog have dates ranging from 1978 to 1987 according to the revision cycle. Also their accuracy must inevitably reflect commercial pressures. So no simple overall image of availability is possible.

Not until the publication of *World Mapping Today* has there been any attempt to fuse the two elements of critical analysis and availability data, to provide a systematic guide for the intending map purchaser.[17] World Mapping contains country by country listings of mapping currently available on the international market arranged under broad thematic headings, together with a textual section describing the mapping for each country. Also given are current (and verified!) addresses of the publishing agencies and guides to useful further reading for a more in depth study of the country. This paper summarizes some of the results of our data collection exercise for that work, and attempts to draw conclusions about how availability has changed, but perhaps first we need to comment on how we arrived at our results.

The data from world mapping rely mainly upon a questionnaire survey of over 1000 map publishers – the response rate obtained varied according to the type of organization and the area of the world (itself an interesting reflection upon availability): thus western European countries responded well, whereas the response rate from African S & M agencies was rather poor. The nature of the response varied enormously too. At one extreme were agencies who replied with very basic catalogues and no specific answers tp questions, whilst at the other extreme some agencies sent very detailed information, map samples, conference papers and specific replies. This questionnaire survey was supplemented by extensive searching both published and unpublished secondary literature and mapping in a country and to build up an overall picture of availability. For instance ICA and UN Regional Cartographic Conference papers were searched to provide an overview of a countries mapping and to identify unknown publishers. The data relate to the period 1984-1986 and were updated where possible to give a 1986 overview of the state of world mapping.

THE RESULTS

To produce an overview of world mapping availability on a country by country basis means analysing not only which categories of maps are available, but also how they are available and if they may not be obtained why they are not available. Table 1.01 illustrates that there are different degrees of unavailability ranging from the extremes of non- publication to complete unrestricted availability. We have only selected some of the many factors that could influence the chances of procuring mapping: the grey areas between the two extremes are the more interesting ones, and have rarely been considered on a systematic basis. Restriction may be placed on all mapping or on some organizations' mapping or upon only some of the mapping issued by an organization. In practice it is very difficult to assign a country to a particular category and further explanation may be required. Table 1.02 is an attempt to provide and overview and to synthesize some of the different reasons for being unable to obtain maps. Perhaps it would be useful to illustrate how a category has been assigned to a country. In India geological, census and small scale thematic and atlas mapping is readily available to the west. True the catalogue information documenting new publications are of very variable quality but there is a large secondary published journal literature describing the maps and mapping systems which compensates for this drawback. It is however more difficult to obtain certain types of topographic mapping. Survey of India only issues catalogues describing their smaller scale and town mapping. Larger scale topographic series mapping is not available on the international market from the Survey, though specifications are well described in the literature. Geocenter however advertises series at larger scales than 1:1 000 000 as being available: they claim to be able to supply, probably through using the services of a local agent able to lubricate the wheels of acquisition, bribe and generally be there on the spot to obtain mapping. Such acquisition is obviously more risky but may

ensure that otherwise unavailable maps are able to be obtained. However even Geocenter does not claim to be able to acquire series mapping of border and coastal areas. So the overall scale restriction on series mapping export may be circumvented, but the area restriction is more strictly applied. It is often very difficult to ascribe a reason for the restriction – "national security" is all too often cited and is given an the Indal explanation of why larger scales are unavailable.

The data presented in the first column of this table relate to the 1986 situation of map availability, but are already probably out of date. Availability can be expected to change very rapidly in response to changing political climates and map librarians' need to be able to take advantage of what Hagen termed the "window of availability" – the moment when a successful acquisition is possible. The window shuts and opens in response to different socioeconomic and political factors.

In addition to these short term and local fluctuations in availability is it possible to identify longer term and larger scale trends? Obviously this is a vast question to which only very tentative and general answers can be given. Comparison with other sources on a country by country basis may be possible: few are appropriate, none is at the same level of detail as our surveys so comparison is difficult. Thus the UN surveys do not consider availability, Lock is too general in content, Geokatalog is a moving target, Carré too impressionistic and Winch's data probably overoptimistic about availability of third world mapping for its date of publication. Nevertheless Winch is the only possible source of sufficient detail claiming to represent a single point in time, so we have attempted a comparison which we hope can complement the comparative UN surveys discussing changes in coverage. So the second column in Table 1.02 shows the early 1970s situation as depicted by Winch.

What have been the more significant changes in map availability in the last decade: how do the two columns differ?

Coverage figures for topographic mapping from the UN surveys reveal that much more is now published, many third world countries are now involved in vast mapping projects, involving topographic surveys, resource inventories and a variety of earth science mapping eg Indonesia, Brazil. This positive picture is not mirrored in availability and our table shows that overall less worldwide topographic coverage is now *available* on the international market than was available a decade ago. In general fewer restrictions are placed on thematic mapping and it is often rather easier to obtain a thamatic coverage, where topographic mapping is restricted eg Indonesia, Taiwan, Korea and Greece.

What are the broad regional trends?

In the early 1970s it was easy to obtain IGN and DOS mapping of Africa, but it is becoming increasingly difficult to obtain current series that have built on the colonial traditions in the post colonial African States. Often only the old colonial sheets are still available to the west. Portuguese and Spanish colonial mapping is no longer available at all. Much Asian mapping remains restricted: it is difficult to obtain material from the vast new Saudi of Indonesian surveys and Chinese topographic mapping is still unavailable to the west. Middle Eastern topographic coverage is mostly still restricted. The situtation in South America is more complicated and may have actually improved slightly despite the impression given in our table. Winch's data suggest an optimistic view of what was available for South America in the early 1970s. The recent involvement of a few specialist North American dealers able to visit and procure otherwise unavailable mapping has ensured an improvement of access to mapping of South America.

There have been few changes in availability in the developed world, and the past decade has seen an increased map output in Western Europe, North America and particularly Australia. Here more mapping is available than in 1976 by virtue of the fact that more has been mapped. Most of Eastern Europe topographic mapping remains unavailable: more geological and environmental mapping may be procured – some Eastern bloc mapping now advertised through Geokatalog is not listed in 1976.

At the world level some series are now no longer available. Thus the status of the once grand cooperative International Map of the World is now almost completely moribund: British and American published sheets in this series are now no longer available and there is little active involvement any more in the project. On the other hand the publication programmes of other UN sponsored projects are alive, more UNESCO resources mapping is available and the Commission for the Geological Map of the World has an active publication programme for smaller scale earth science material.

So the overall pattern is one of improving availability of more specialised mapping for much of the world, and of topographic coverage for the western developed world, whilst more restrictions have been applied to limit the availability of third world topographic mapping.

IMPLICATIONS

Why have these increasing restrictions been applied and how can map collections respond to the difficulties?

It is possible to discuss map availability in terms of the factors likely to influence the chances of procuring a map.[18] Thus Perkins considers the nature of the agency issuing the mapping in terms of whether is is civilian or military, where it is located, the areas mapped, its functional responsibilities, whether it is official or commercial, decentralized or centralized and what form of relationship exists between the agency and its customers. He concludes that

"there is a continuum which ranges from the optimum: [for availability]

– a public sector centralized official mapping agency in the western developed world, with civilian mapping responsibilities including the compilation of general and topographic mapping of its own state, which sells direct to the customer

to the worst possible organization for map acquisition:

– a public sector decentralized official mapping agency in the third world in a pro-Eastern block country, with military responsibilities including a very wide range of mapping tasks, whose maps are compiled through overseas aid programmes and which either operates only a very indirect sales service or does not sell maps".

Thus part of the problem in the last decade has been that more mapping is being issued by agencies matching the latter rather than the former model. This has taken place with the gradual disengagement of colonial mapping agencies from third world programmes, and the establishment of indigenous surveys.

A second set of reasons for availability problems arises from the nature of mapping and the ways in which this has changed. There is some evidence that maps are becoming more ephemeral. Not only may there be limited print runs of published mapping, semi published material is becoming more common in an attempt to reduce the lag between survey and published map. Such semi publications, whether Open File compilations or survey information are only rarely adequately listed. True ephemeral electronic maps are as yet rare in national surveying and mapping establishments but can be expected to increase.

A third set of reasons relates to the ways in which it is possible to identify what has been published. Thus published and available mapping may not actually be available unless the customer knows about it. The lack of adequate in print listings means it is difficult to acquire maps. There have been few changes here in the last decade, indeed Geokartenbrief now probably picks up more material than was the case a decade ago, and Geokatalog is now complete. So whilst the lack of bibliographic control may explain some of the problems, it can not be used to explain the trends.

How have map libraries responded to the changing trends in availability?

To answer this question would require detailed surveys of library policies – a few general trends and possibilities only will be noted here.[19]

The response has varied depending upon the location and organizational situation of the collection. Doehlert acknowledges that acquisition policies must take account of both budget, needs and availability of material, and in practice all map collections recognise this truism.[20] If a library's acquisition policy suggests a need to procure mapping of areas where it is unavailable then there may be several alternatives.

It may be possible to circumvent some of the availability problems by using alternative methods of acquisition. Thus large collections may have the opportunity to purchase material that would otherwise be unavailable by using an agent local to the map publisher. Acquisition in person in more likely to succeed than a postal application. The smaller collections are less likely to be able to use this facility. Other ways are to keep as aware as possible of changes in the window of availability, in order to place orders at a politically propitious time and procure otherwise unavailable material. Careful use of as wide a variety of sources as is possible may also enable difficult maps to be acquired.

Also restricted material may sometimes be obtained providing it is to be used for an approved project. Some collections may be able to take advantage of gift or exchange programmes direct with the host survey organization. This is particularly the case in military or official mapping agency map libraries eg in the UK where the Ministry of Defence procures material from friendly third world countries which would be impossible for other collections to obtain. In the past another answer to unavailability of indigenous topographic mapping was to rely upon deposit schemes, in which the western official mapping agency allowed collections to keep stocks of its otherwise restricted official series covering foreign areas. Thus American collections have built substantial collections of AMS and DMA topographic series

mapping of the world. In the UK the deposit of DOS mapping has ensured good coverage of areas of British interest in Africa, the Caribbean and parts of Asia. However such deposit schemes no longer operate and are unlikely to continue to offer solutions: the archive is growing older and is of progressively less use.[21]

All of these solutions have been tried. All are second best and involve considerable staff effort. In practice many map libraries simply end up acknowledging unavailability in their acquisition policies. Restrictions have increased at a time when available resources to many map librarians have decreased, so one could argue that some of the material would not anyway have been obtained. The larger collections devote time to procuring, the smaller collections have neither the time nor the resources to follow up the difficult material. So availability of topographic mapping is becoming more polarised; the provision of material in library collections both reflects this and is also resulting in a less even distribution of material in collections, because of resource limits.

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TABLE 1.01 DEGREES OF MAP AVAILABILITY

The degree of availability decreases as one reads down the table.

1. AVAILABLE BY POSTAL APPLICATION

a – Many possible sources
b – Available only through jobber
c – Part series only available (area restriction)
d – Part of scale range only available (scale restriction)
e – Part of subject coverage only available (theme restriction)
f – Official permission required
g – Available only for approved projects: civilian or military

2. ONLY AVAILABLE IN COUNTRY OF PUBLICATION

a – Can be purchased over the counter and exported
b – Can be purchased over the counter but not for export
c – Can be purchased over the counter with bribe or personal contact with officials

3. NOT AVAILABLE ON INTERNATIONAL MARKET

a – published and documented in secondary literature
b – published but not documented in secondary literature
c – published but out of print

4. NOT PUBLISHED

TABLE 1.02 PATTERNS OF MAP AVAILABILITY

This table shows the overall pattern of in print official map availability and reflects the broad headings used in Table 1.01. If material is available by post is will also be available in the country of publication: we have not repeated the categories. Unlike other tabulations and maps it attempts to assess both topographic and other official published mapping availability on a country by country basis. If not specified the availability criteria apply to all published current official mapping of the country. Further explanations of the availability constraints are given for particular countries, (eg for French African countries topographic mapping availability differs according to whether it is old colonial mapping or post independence surveys). It should be noted that all too often the reasons for restriction are not made clear, this table therefore indicates the *Likely* reasons for unavailability, or simply classifies the mapping within the 3 category.

Topo = topographic; geol. = geological; env. = environmental

Area	1986 Availability	1976 Availability
AFRICA		
Algeria	Topo. 1b or 2c; geol. 1a	1a
Angola	3b	1a
Benin	Topo. (old stock 1b, new cover 2c); env. 1a	1a
Botswana	1a	1a
Burkina Faso	Topo. (old stock 1b, new cover 1a); geol. 1a; env. 1a	1a
Burundi	1b	1a
Cameroon	Topo. (old stock 1b, new cover 2c); geol. 1a (old); env. 1a	1a

Central African Republic	Topo. (old stock 1b, new cover 2c); env. 1a	1a
Chad	Topo. (old stock 1b but 1f); env. 1a	1a
Congo	Topo. (old stock 1b, new cover 2c); env. 1a	1a
Djibouti	Topo. (old stock 1b); geol. 1a	1a
Egypt	Topo. 2c; geol. 1a but 1c, 1d and 1e	2c
Equatorial Guinea	3a	1a
Ethiopia	3a	1a
Gabon	Topo. (old stock 1b, new cover 2c); env. 1a	1a
Gambia	1a	1a
Ghana	1a (also old stock 1b)	1a
Guinea	Topo. (old stock 1b but 1f)	1a
Guinea Bissau	3c	1a
Ivory Coast	Topo. (old stock 1b, new cover 1a)	1a
Kenya	1a, 1f for larger scale series	1a
Lesotho	1a	1a
Liberia	1a, through jobbers and aid agencies	1a
Libya	3a	3a
Madagascar	1d (larger scales 2b)	1a
Malawi	1a	1a
Mali	Topo. (old stock 1b but 1f)	1a
Mauritania	Topo. (old stock 1b)	1a
Morocco	1a	1a
Mozambique	Topo.3b; geol. 1a	1a
Namibia	1a	1a but almost 4
Niger	Topo. (old stock 1b but 1f)	1a
Nigeria	1b, or 2b	1a
Rwanda	1a	1a
Senegal	Topo. (old stock 1b, new cover 1a); geol. and env. 1a	1a
Sierra Leone	1a (old stock 1b)	1a
Somalia	3b (but some old stock 1b)	1b old stock
South Africa	1a	1a
Sudan	1a	1a
Swaziland	1a	1a
Tanzania	1a	1a
Togo	Topo. (old stock 1b); env. 1a	1a
Tunisia	2b, 2c	1a
Uganda	1b	1a
Zaire	1b	1a
Zambia	1a	1a
Zimbabwe	1a	1a
NORTH AMERICA		
Canada	1a	1a
Mexico	1a	1a
USA	1a	1a
CENTRAL AMERICA		
Belize	1b	1a
Costa Rica	1a	1a
El Salvador	1d (larger scales 1g)	1d
Guatemala	1d (larger scales 1f)	1a
Honduras	1d (larger scales 1g)	1a
Nicaragua	3a	1a
Panama	1a	1a
CARIBBEAN		
Anguilla	1a	1a
Antigua	1a	1a
Barbados	1a	1a
Bahamas	1a	1a
Barbuda	1a	1a
Cayman Islands	1a	1a
Cuba	1d (larger scales 3a)	1a
Dominica	1a	1a
Dominican Republic	1b	1a
Granada	1a	1a
Haiti	1a	1a
Jamaica	1a	1a
Martinique	1a	1a
Monserrat	1a	1a
Netherlands Antilles	3c	1a
Puerto Rico	1a	1a
St. Christopher-Nevis	1a	1a
St. Lucia	1a	1a
St. Vincent	1a	1a
Trinidad and Tobago	1a	1a
Turks and Caicos	1a	1a
Virgin Islands (British)	1a	1a
Virgin Islands (US)	1a	1a
SOUTH AMERICA		
Argentina	1a	1a
Bolivia	1a	1a
Brazil	1a	1a
Chile	1a	1a
Columbia	1d (larger scales 1f, 1c border areas)	1a
Ecuador	1a	1a
French Guiana	1a	1a
Guyana	1a	1a
Paraguay	1b	1a
Peru	1a but 1c for some series	1a
Surinam	1a	1a
Uraguay	1a	1a
Venezuela	1a	1a
ASIA		
Afghanistan	3b	1a
Bahrain	1a	1a
Bangladesh	1d (larger scales 3a or 2c)	1d (larger scales 3a)
Bhutan	4	4
Brunei	1d, (larger scales 1g or 2c)	1d (larger scales 3a)
Burma	3b	3b
China	3a	3a
Cyprus	1a	1a
Hong Kong	1a	1a
India	Topo. 1d (larger scales 2b, or 2c, with borders 1c); geol.1a env. 1a	1d (larger scales 3a); geol. and env. 1a
Indonesia	3a	1a
Iran	Topo. 3a, geol. 1a	Topo.3a, geol.1a
Iraq	3a	3a
Israel	1a	1a
Japan	1a	1a
Jordan	3a	1a
Kampuchea	3c	3c
Korea (North)	3b	3b
Korea (South)	1d (larger scales 1f); geol 1a	1d; geol. 1a
Kuwait	3a	3a
Laos	3c	1a but old
Lebanon	1a but old	1a
Macao	1a	1a
Malaysia	1d (larger scales 1g or 2c)	1d (larger scales 3a)
Mongolia	3a	3a
Nepal	1d (larger scales 2b, or 2c)	1d (larger scales 2b or c)
Oman	3b	3b
Pakistan	Topo. 1d (larger scales 2b, or 2c, with 1c for border areas)	1d (larger scales 3a)
Papua New Guinea	1a	1a
Philippines	1a	1a
Qatar	1a	1a
Saudi Arabia	1d and 1e (larger scales 2c)	1d (larger scales 3a)
Singapore	1a	1a
Sri Lanka	1d (larger scales 2b, or 2c or 3a)	1a
Syria	Topo. 3a; geol. 1a	1a
Taiwan	3b	3b
Thailand	Topo. 1d, (larger scales 1g); geol. 1a; env. 1a	Topo. 1d (larger scales 1g) geol. and env. 1a)
Turkey	1d, (larger scales 1g)	1d (larger scales 3a)
United Arab Emirates	3b	3b
USSR	1d, (larger scales 3a)	1d (larger scales 3a)
Vietnam	3a	1a

Yemen Arab Republic	2b, (1g or 3a)	Mostly 4
Yemen (South)	3c, old stock from jobbers	1a
AUSTRALASIA		
Australia	1a	1a
New Zealand	1a	1a
EUROPE		
Albania	1d, (larger scales 3b)	1d (larger scales 3b)
Andorra	1a	1a
Austria	1a	1a
Belgium	1a	1a
Bulgaria	1d, (larger scales 3a)	1d, (larger scales 3a)
Czechoslovakia	Topo. 1d, (larger scales 3a); geol. 1a	Topo. 1d; geol. 1a
Denmark	1a	1a
Finland	1a	1a
France	1a	1a
German Democratic Rep.	1d, (larger scales 3a)	1d, (larger scales 3a)
German Federal Rep.	1a	1a
Gibraltar	1b	1a
Great Britain	1a	1a
Greece	Topo. 1d (larger scales 1g); geol. 1a	Topo. 1d (larger scales 1g); geol. 1a
Hungary	Topo. 1d, (larger scales 3a); geol. 1a	Topo. 1d, (larger scales 3a); geol. 1a
Iceland	1a	1a
Ireland (North)	1a	1a
Ireland (South)	1a	1a
Italy	1a	1a
Liechtenstein	1a	1a
Luxembourg	1a	1a
Malta	1a	1a
Monaco	1a	1a
Netherlands	1a	1a
Norway	1a	1a
Poland	Topo. 1d, (larger scales 3a); geol. 1a	Topo. 1d, (larger scales 3a); geol. 1a
Portugal	1a	1a
Romania	Topo. 1d (larger scales 3a); geol. 1a	1d (larger scales 3a)
San Marino	1a	1a
Spain	1a	1a
Sweden	1a	1a
Switzerland	1a	1a
Yugoslavia	1d (larger scales 3a)	1a (larger scales 3a)
ATLANTIC OCEAN		
Ascensiin Island	1a	1a
Azores	1a	1a
Bermuda	1a	1a
Bouvet Island	1a	1a
Canary Islands	1a	1a
Cape Verde Islands	1d	1a
Faeroe Islands	1a	1a
Falkland Islands	1d (larger scales 2e)	1a
Madeira	1a	1a
St Helena	1a	1a
St Paul Miquelon	1a	1a
Sao Tome and Principe	1a	1a
South Georgia	1a	1a
South Sandwich	1a	1a
Tristan da Cune	1a	1a
INDIAN OCEAN		
Christmas Island	1a	1a
Cocos Island	1a	1a
Comoros	1a	1a
French S. and Ant. Terr.	1a	1a
Heard Island	1a	1a
Maldives	1a	1a
Mauritius	1a	1a
Reunion	1a	1a
Seychelles	1a	1a
PACIFIC OCEAN		
American Samoa	1a	1a
Cook Islands	1a	1a
Easter Island	3b	3b
Fiji	1a	1a
French Polynesia	1a	1a
Galapagos Islands	4	4
Hawaii	1a	1a
Kiribati	1a	1a
Nauru	1a	4
New Caledonia	1a	1a
New Zealand Dependencies	1a	1a
Norfolk Island	1a	1a
Pacific Trust Territories	1a	1a
Solomon Islands	1a	1a
Tonga	1a	1a
Tuvalu	1a	1a
Vanuatu	1a	1a
Wallis and Futuna Islands	1a	4
Western Samoa	1a	1a
POLAR REGIONS		
ARCTIC		
Greenland	1a	1a
Jan Mayen	1a	1a
Spitzbergen	1a	1a
ANTARCTICA	1a, Russian areas 1d, (larger scales 3a)	1a (Russian areas 1d,(larger scales 3a)
Antarctic Islands	1a	1a

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L'AUTOMATISATION AU DÉPARTMENT DES CARTES ET PLANS DE LA BIBLIOTHÈQUE NATIONALE

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Dépositaire, par la loi du 21 juin 1943, du Dépôt légal des atlas, cartes et plans, le Département des Cartes et Plans de la Bibliothèque national reçoit á ce titre environ 2000 documents par an. A ces chiffres, viennent s'ajouter les dons, les acquisitions étrangères les échanges internationaux qui portent le total des accroissements annuels à environ 10 000 documents.

Par le volume comme par la variété de ses fonds, le Département représente une des plus importantes cartothéques mondiales : ses collections, fortes de près d'un million de pièces, comportent des documents aussi divers que des cartes ou des globes, en passant par des plans en relief, des objets (astrolabes, boussoles, sphères armillaires, jeux géographiques, etc...), des spatiocartes ou des atlas.

A l'intérieur de la Bibliothèque nationale, le Département des Cartes et Plans a pour mission non seulement de conserver mais aussi de cataloguer et traiter ces documents afin que ce fonds devienne exploitable et vivant. L'informatisation croissante des bibliothèques et des établissements spécialisés en cartographie appelle une réponse de la Bibliothèque nationale ; c'est pourquoi la diffusion élargie des références des documents entrés dans le Département ets complémentaire du rôle de conservation et de restauration de cet établissement.

Jusqu'alors, le traitement catalographique des documents entrés donnait lieu à la rédaction et à l'intercalation de fiches "manuelles" dans les différents fichiers de la salle de travail :

- auteurs – éditeurs
- noms géographiques (sous-classement chronologique et par échelle)
- mots matières.

Par ailleurs, le Département des Cartes et Plans édite le Supplé-

ment IV de la Bibliographie de la France, recensant les atlas, cartes et plans reçus par dépôt légal. Ce supplément est édité une fois par an et a vu sa diffusion élargie depuis 1985 par la reprise de ses notices dans Intergéo-Bulletin, publication du Laboratoire d'information et de documentation en géographie, organisme dépendant du Centre National de la Recherche Scientifique (C.N.R.S.)

Pour offrir aux chercheurs ou lecteurs une recherche à la fois plus rapide et plus sûre, l'informatisation du Service des Entrées s'avère indispensable. Mais le Département des Cartes et Plans n'est pas un organisme autonome : il fait partie intégrante de la Bibliothèque nationale qui, à terme et grâce au logiciel GEAC, doit offrir au public une base multi-media dans laquelle auront leur place les collections du Département.

En outre, les établissements extérieurs à la Bibliothèque nationale, mais qui travaillent sur les secteurs cartographiques ou géographiques, s'informatisent actuellement et attendant beaucoup de la Bibliothèque national en matière de normalisation et de catalogage.

Ces établissements, avec lesquels le Département des Cartes et Plans travaille de façon fructueuse depuis de nombreuses années, sont prêts à collaborer de manière encore plus étroite ; c'est ainsi que le Service Hydrographique et Océanographique de la Marine (SHOM), L'Institut Géographique national (I.G.N.), l'Institut National de la Statistique et des Etudes Economiques (INSEE), l'Institut méditerranéen des Géosciences, Intergéo (C.N.R.S.), le Bureau de Recherches Archéologiques et Minières (B.R.G.M.), la Bibliothèque de l'Ecole des Mines, la Bibliothèque Interuniversitaire des Sciences de la Terre à Jussieu, l'Institut français de recherche scientifique pour le développement en coopération (publications de l'Office de Recherche Scientifique et Technique Outre-Mer (ORSTOM)) ont participé aux travaux d'élaboration d'un protocole destiné à définir les données indispensables aux échanges dans le cadre d'un réseau de catalogage partagé, étape indispensable avant la rédaction d'un format spécialement développé pour les documents cartographiques.

La base de données cartographiques du département des Cartes et Plans est articulée autour de plusiers grands axes :

- un système descriptif
- un système d'indexation
- des fichiers "bibliographiques"
- des fichiers "d'autorité" (personnes physiques, collectivités, noms geographiques, mots matières)
- des fichiers de liens
- des tables (type de document, support, langue, type de projection méridien d'origine, etc...)

CONCEPTION DU SYSTEME D'INFORMATION

Le système descriptif s'appuie sur deux bases principales :

- La structure d'analyse respecte celle de l'*International Standard Bibliographic Description for Cartographic Materials (I.S.B.D. (CM))*, dans un souci de compatibilité internationale.
- Le catalogage suit les règles de la norme expérmentale française de catalogage des documents cartographiques *AFNOR Z 044-067* (avril 1981). Cette norme est actuellement en cours de révision en vue de son homologation définitive à l'automne 1987.
- Ont également été consultées les *Anglo-American Cataloguing Rules (A.A.C.R. 2, 1980).*
- Le format *INTERMARC (C)*, c'est-à-dire la prise en compte des éléments obtenus lors de l'analyse précédente en vue de leur entrée en machine et leur structuration normalisée en vue d'échanges internationaux a été écrit d'après le format INTERMARC (M), format créé par la Bibliothèque nationale pour les notices bibliographiques de monographies et d'après le format international d'échanges *UNIMARC* pour les données spécifiques au document cartographique.

  La principale modification par rapport au format INTERMARC (M) a été l'abandon de certaines zones trop particulièrement destinées aux livres (titres de classement ou titres uniformes, par exemple) et l'adjonction de zones particulières aux documents cartographiques (échelle, projection, méridien d'origine et coordonnées qui seront la véritable clef de voûte du système), création d'un champ de dates permettant de redre comte de la spécificité des combibaisons de dates pouvant apparaître sur un document cartographique (levés, élaboration, diffusion, révision, traitements informatisés, dates liées au contenu ou à l'exemplaire), création d'un champ d'informations codées particulières aux documents cartographiques et permettant d'inclure les nouvelles techniques (degré de résolution, technique d'enregistrement, nom du satellite, bandes spectrales utilisées, etc...)

  Par l'intermédiaire du Centre de Coordination Bibliographique et Technique de la Bibliothèque national (C.C.B.T.), le champ 044, contenant les dates, a fait l'objet d'une proposition d'addition au format UNIMARC.

  Le format INTERMARC (C) a été développé afin de permettre l'intégration de tous types de documents dans la base de données.
- Le système d'indexation s'appuie sur le thésaurus *LAVAL* également utilisé par les autres Départements de la Bibliothèque nationale et la Bibliothèque Publique d'Information. L'esprit de ce vocabulaire, général et simple, semble assez bien adapté au document cartographique.

LE FORMAT INTERMARC (C)

Le format défini pour la decription des documents cartographiques divise les données recueillies en quatre grandes catégories :

- **Guide :**

c'est un champ d'une longueur fixe de 24 caractères qui contient les informations nécessaires au traitement automatique des notices.

- **Champs 008 et 009 :**

ce sont également deux champs de longueur fixe qui contiennent des informations concernant l'ensemble de la notice catalographique ; ces informations sont codées sur des positions fixes ; ces champs sont surtout destinés à effectuer des tris, des sélections ou des statistiques. Le champ 008 contient des informations valables pour n'importe quel type de document (langue, pays d'édition, etc...) ; en revanche, le champ 009 contient des informations propres au document cartographique (type de document, support, etc...).

- **Zones de contrôle structurées :**

Ces champs, portant les étiquettes comprises entre 001 et 090, contiennent des éléments d'information dont le contenu est généralement de longueur fixe : I.S.B.N., I.S.S.N., numéro d'inventaire, dates, données mathématique cote, codes de langue, etc...

- **Zones variables :**

Ces champs, dont les étiquettes courvent l'intervalle compris entre245 et 823 représentent l'élément véritablement descriptif de la notice catalographique ; on y trouve lle titre, la mention d'édition, l'éditeur, la description technique, la collection, les notes, les liens entre notices ou fichiers, le dépouillement, etc...

Les zones "vedette" sont destinées au classement et à l'interrogation des notices ; on y trouve l'auteur, qu'il soit personne physique ou collectivité, la vedette géographique et la vedette matière.

SAISIE

Pour la plupart des documents modernes, la saisie s'effectuera directement en ligne, en transcrivant dans le fichier de travail les informations qui apparaissent sur le document lui-même ; les informations saisies seront testées et vérifiées par des tables de validation (codes de pays, codes de langue, etc...), les champs contenant des informations relevant des fichiers d'autorité seront vérifiés en temps réel ; sont également prévus des contrôles de cohérence entre plusieurs champs. Pour un certain nombre de cas, notamment les documents anciens manuscrits, qui nécessitent des recherches ou des vérifications parfois importantes (identification de l'auteur, de l'éditeur, de la zone géographique représentée, calcul de l'échelle d'aprés les mesures anciennes, etc...), le recours au bordereau papier pourra s'avérer indispensable. Il en ira de même pour les documents de très grand format, même s'ils ne posent pas de problèmes cartographiques particuliers.

TRAITEMENT DES SERIES

Dans toute cartothèque, c'est u problème important qi'il n'est pas facile de résoudre de façon élégante et sastifaisante. Dans le système manuel antérieur, on se contentait, faute de temps, d'une description sommaire de la série, d'un bulletinage sur fiches de type KARDEX et d'une inscription sur tableaux d'assemblage. Si cette manière de faire permet de se rendre compte immédiatement de la "complétude" d'une série, elle n'offre pas, en revanche, de grandes possibilités documentaires et le recours au document primaire s'avère souvent indispensable. C'est pourquoi il a été décidé, dans le cadre d'une procédure de catalogage automatisé, d'utiliser un traitement par niveaux ; trois niveaux ont ainsi été définis :

- premier niveau, qui contient les données communes à tous les éléments contituant la série cartographique (par exemple, auteur, éditeur, échelle, projection, représentation du relief, titre, format, etc...)
- second niveau qui contient les éléments intermédiaires (cas notament des sous-séries) ; ce niveau sera le moins utilisé des trois. Ex. Atlas linguistique de la France (premier niveau)
  Aquitaine (second niveau)
- troisième niveau, qui contient les éléments d'information propres à l'unité cartographique traitée, qu'elle soit feuille, cou-

pure ou fascicule. (titre, numérotation dans la série, coordonnées, dates, mention d'édition, etc...)

Des liens informatiques sont prévus pour assurer le passage d'un niveau à l'autre. On a ainsi la possibilité d'interroger quel que soit le niveau, aussi bien par les caractérstiques générales de la série que par les éléments du troisième niveau qui, de façon fictive, font de cet élrhent ou bien un document isolé ou bien une partie du dépouillement de l'ensemble.

MISE A JOUR

Chaque soir, les notices validées seront transférées par programme "batch" du fichier de travail dans le fichier cartographique de la base de données ; les index seront mis à jour et les liens entre notices à niveaux ou entre fichier descriptif et fichiers d'autorité seront établis. Un listage des anomalies constatées permettra la correction dès le lendemain.

INTERROGATION ET RECHERCHE

L'interrogation de la base de données pourra s'effecteur de plusiers façons :

- interrogation simple par un seul critère. Cette procédure permettra d'obtenir, par écrans de 10 références, au choix de l'utilisateur, ou bien les documents les plus récents ou bien les documents les plus anciens entrés dans la base.
- interrogation permettant, par l'intermédiaire d'un menu, d'effectuer un recherche multi-critère. Cette procédure permettra de réponder à des questions plus complexes puisqu'on pourra combiner jusqu'à 4 critères. La stratégie d'interrogation sera défine par l'utilisateur lui-même qui "hiérarchisera" ses critères d'accés.
- interrogation par opérateurs booléens permettant une recherche encore plus fine.

Les principaux accés possibles sont :

- l'auteur, personne physique ou collectivité
- l'éditeur-libraire-imprimeur
- le titre
- l'échelle
- les coordonnées géographiques
- le méridien d'origine
- les dates, par l'intermédiaire d'un sous-menu
- le type de projection
- le nom géographique, les formes rejetées étant également interrogeables grâce à la "synonymie" assurée par les fichiers d'autorité
- le thème ou sujet
- la collection éditoriale
- les entrées analytiques, notes de contenu ou de dépouillement
- la cote et la localisation
- l'I.S.B.N. et l'I.S.S.N.
- le numéro d'entrée (gestion du dépôt légal, des acquisitions, dons et échanges).

OBJECTIFS

A partir de la base de données documentaires, sont actuellement à l'étude l'analyse et la conception d'une application VIDEOTEX selon les standards français TELETEL 1 ou TELETEL 2. Cette extension devrait voir le jour à la fin de 1987. Si les standards prévus s'adressent plutôt à un public de spécialistes ou de professionnels, l'idée d'une base "grand public" selon le standard TELETEL 3 est envisagée au cours de développements ultérieurs.

Actuellement, ni la numérisation des documents cartographiques, ni le traitement des données numérisées provenant des images satellite ne sont envisagés au Département des Cartes et Plans.

En revanche, un essai de vidéodisque a été réalisé mais la définition par trop grossière n'a pas permis de continuer cette expérience. En collaboration avec le Service informatique de la Bibliothèque national, est actuellement à l'étude un projet qui devrait voir le jour d'ici deux ans. Ce projet serait l'aboutissement du travail de normalisation effectué jusqu'ici en permettant la recherche d'un document cartographique à partir de ses points de coordonnées géographiques sans les connaître avec précision : du planisphère apparaissant sur l'écran, l'utisateur aura la possibilité de rechercher la zone géographique ou l'agglomération qu'il désire par jeu de zoom et déplacements du curseur. un sous-menu proposant un choix par des critères secondaires (échelle, thème, etc...) permettra d'obtenir les notices catalographiqes des documents disponibles. En outre, l'utilisation des points de coordonnées géographiques permettra la réalisation de tableaux d'assemblage automatiques.

	ETIQUETTE		INDICATEURS		CODES		INFORMATIONS
*	001 Numéro d'identification	#				#	Numéro
	015 Numéro de la notice publiée dans la bibliographie nationale	#	#	#	$a	#	Numéro
	019 Numéro de la notice étrangère	R	#	#	$a	#	Pays
					$b	#	Source
					$c	#	Numéro
*	020 ISBN et prix	#	#	#	$a	#	ISBN
					$b	R	Qualificatif
					$d	R	Prix
					$z	R	ISBN erroné
*	022 ISSN	#	#	#	$a	#	ISSN
			1		$b	#	Qualificatif
					$d	R	Prix
					$z	R	ISSN annulé
*	036 Origine et Numéro d'entrée	R	#	#	$a	#	Numéro
*	040 Pays d'édition	#	#	#	$a	R	Pays
*	041 Langues	#	0				Multilingue ou de langues diverses
			1				Traduction, avec ou sans titre original
			2				Contient des traductions
				#	$a	R	Langue du texte
					$b	R	Langue intermédiaire
					$c	R	Langue originale
					$d	R	Langue des résumés
*	042 Données mathématiques	#	0			#	Echelle non déterminée
			1			#	une échelle ou un ensemble d'échelles de même valeur.
			2			#	deux ou plusieurs échelles
			3			#	série d'échelles
				#	$a	#	Type d'échelle
					$b	R	Echelle horizontale
					$c	R	Echelle altimétrique
					$d	#	Coordonnées : longitude Ouest
					$e	#	Coordonnées : longitude Est
					$f	#	Coordonnées : latitude Nord
					$g	#	Coordonnées : latitude Sud
					$h	#	Echelle angulaire
					$i	#	Déclinaison
					$k	#	Ascension droite : limite Est
					$m	#	Ascension droite : limite Ouest
					$n	#	Equinoxe

ETIQUETTE		INDICATEURS		CODES		INFORMATIONS	
043	Expression du relief, projection et méridien d'origine	#	#	$a	#		Relief
				$b	#		Projection
				$c	#R		Méridien d'origine
044	Dates	#	0				
			1				
			2	#	$a	R	Lever
					$b	R	Elaboration
					$c	R	Diffusion
					$d	R	Révision
					$e	R	Sujet
					$f	R	Exemplaire
090	Cote	R	#	#	$c	#	Sigle de la bibliothèque
					$d	#	Sigle du fonds particulier
					$a	#	Cote
					$e	#	Etat de la collection
					$f	#	Particularités d'exemplaire
					$g	R	Provenance de l'exemplaire
					$5	R	Caractéristiques d'exemplaire codés
100	Auteur principal personne physique	R	#				
			3				Prénom
			4				Nom
			5				Famille
				$3	#		Numéro d'identification de la notice autorité
				$4	R		Code de fonction ou à défaut de $3
				$a	#		Elément d'entrée
				$m	#		Elément(s) du nom rejeté(s)
				$e	R		Qualificatif
				$d	#		Dates
				$u	#		Numérotation
110	Auteur principal Collectivité et congrès	R	#	#	$3	#	Numéro d'identification de la notice d'autorité
					$4	R	Code de fonction ou à défaut de $3
					$a	#	Elément d'entrée
					$b	R	Sous-vedette
					$c	R	Lieu
					$q	R	Autre qualificatif
					$p	R	Elément rejeté
					$n	R	Reste du nom après un élément rejeté

ETIQUETTE		INDICATEURS		CODES		INFORMATIONS	
				ǂi	R	Numéro)	
				ǂd	R	Année)	
				ǂk	R	Mois) du congrès	
				ǂj	R	Jour)	
				ǂl	R	Lieu)	
245	Titre propre	ǂ					
			0			Titre non significatif	
			1			Titre significatif	
				ǂa	ǂ	Titre	
				ǂe	R	Complément du titre	
				ǂf	R	Première mention de responsabilité	
				ǂg	R	Mention(s) de responsabilité suivante(s)	
				ǂi	R	Titre de partie	
				ǂh	R	Numéro de partie	
				ǂv	R	Numéro de volume ou de coupure	
				ǂb	R	Autre titre du même auteur	
				ǂc	R	Autre titre d'un auteur différent	
				ǂz	R	Langue(s) codée(s)	
				ǂr	ǂ	Reste de la zone	
247	Titre parallèle	R				Cf. zone 245	
250	Mention d'édition	ǂ	ǂ	ǂ	ǂa	R	Mention d'édition
					ǂf	R	Première mention de responsabilité
					ǂg	R	Mention(s) de responsabilité suivante(s)
					ǂd	R	Mention d'édition parallèle
					ǂu	ǂ	Numéro de l'édition
256	Données mathématiques	ǂ	ǂ	ǂ	ǂa	ǂ	Mention d'échelle
					ǂb	ǂ	Mention de projection
					ǂc	ǂ	Mention des coordonnées
					ǂd	ǂ	Mention de la zone
					ǂe	ǂ	Mention d'équinoxe
260	Adresse de l'éditeur	ǂ	ǂ	ǂ	ǂa	R	Lieu
					ǂb	R	Adresse détaillée
					ǂc	R	Nom
					ǂd	R	Date
270	Adresse de l'imprimeur ou du Colophon	ǂ				Cf. zone 260	
280	Collation	ǂ	ǂ	ǂ	ǂa	ǂ	Nombre de volumes et pagination ou nombre de coupures
					ǂc	ǂ	Illustration
					ǂd	ǂ	Format
					ǂe	R	Matériel d'accompagnement

ETIQUETTE			INDICATEURS		CODES		INFORMATIONS
295	Titre propre de collection	R	0				Titre non significatif
			1				Titre significatif
				♭	♯a	♯	Titre propre de la collection
					♯e	R	Complément du titre
					♯f	R	Mention de responsabilité
					♯x	♯	ISSN
					♯v	R	Numérotation du volume
					♯h	R	Numéro de la sous-collection
					♯i	R	Titre de la sous-collection
					♯z	R	Langue(s) codée(s)
297	Titre parallèle de collection	R					Cf. zone 295
300	Notes	♯	♭	♭	♯a	R	Texte
324	Note de fac-similé	♯	♭	♭	♯a	♯	Texte
327	Note de dépouillement	♯	♭	♭	♯a	R	Texte
410	Lien avec notice de collection	R	♭	♭	♯3	♯	Numéro de la notice de collection
					♯v	R	Numéro de volume
					♯d	R	Date du volume
421	A pour supplément...	R	♭	♭	♯3	♯	Numéro de la notice fille
422	Supplément de...	R	♭	♭	♯3	♯	Numéro de la notice mère
461	Lien avec notice de niveau 1	♯	♭	♭	♯3	♯	Numéro de la notice de niveau 1
462	Lien avec notice de niveau 2	♯	♭	♭	♯3	♯	Numéro de la notice de niveau 2
463	Lien avec notice générale	♯	♭	♭	♯3	♯	Numéro de la notice générale
606	Vedette matière nom commun	R	♭	♭	♯3	♯	Numéro d'identification de la notice d'autorité
							ou à défaut de ♯3
					♯a	♯	Elément d'entrée
					♯g	R	Précision
					♯o	R	Inversion
					♯s	R	Reste de l'élément
607	Vedette matière nom géographique	R	♭	♭	♯3	♯	Numéro d'identification de la notice d'autorité
							ou à défaut de ♯3
					♯a	♯	Elément d'entrée
					♯g	R	Précision
					♯o	R	Inversion
					♯b	R	Sous-vedette
					♯s	R	Reste de l'élément

ETIQUETTE		INDICATEURS		CODES		INFORMATIONS	
675	Indice CDU	R	∅ ∅	$a	∄	Indice	
				$v	∄	Edition	
676	Indice Dewey	R	∅ ∅	$a	∄	Indice	
				$v	∄	Edition	
677	Classement	∄	∅ ∅	$a	∄	Généralités	
				$b	∄	Continents	
				$c	∄	Pays	
				$d	∄	France	
700	Auteur secondaire personne physique					Cf. zone 100	
710	Auteur secondaire collectivité					Cf. zone 110	
823	Entrée analytique	R	∅ ∅	$1	R	Zone de la notice analytique	

R = l'étiquette ou la sous-zone peuvent être répétées
∄ = non répétées

42-GEO-1-E

ONLINE BIBLIOGRAPHIC AND CIRCULATION SYSTEMS: THE ILLINOIS EXAMPLE

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ABSTRACT

The recataloging project at the University of Illinois Map & Geography Library will be discussed. A recent U.S. Office of Education Title II-C grant is allowing the Library to recatalog its collection of 525,000 maps and aerial photographs. This project not only employs the use of a national data base (OCLC), but also uses a local computer system to illustrate holdings information for individual sheets, editions and/or years. In addition, the local system provides a double-tiered level of information from a simple author-title-access number printout to a complete bibliographical format. Slides will illustrate the various outputs a user can recieve. When completed in 1987 this project will allow the University of Illinois complete automated access to its cartographic holdings and allow other libraries to access these materials through the national OCLC data base.

I do not think anyone would disagree with the statement that the key to accessing cartographic information today is related to the amount of computer technology used. The literature constantly reminds us of the value of various atuomated systems and their problem solving capabilities. As you know, there has been an explosive increase in the amount of earth science information available in the last decade. The major contribution, of course, is the significant growth in remotely sensed imagery. Even though 'privatization' has increased the price of data, it continues to be created and stored for future use.

The majority of systems advertised in the literature are intended to control the data inventory of a particular engineering firm, government agency, or local planning office. These systems are usually employed to create, store and retrieve large-scale surveys and may include various data structure elements used to delineate boundary files. Essentially, these firms and/or agencies us these systems as a personal 'Geographic Information System.'

To suggest that similar systems exist in map collections would be simply untrue. A hopeful suggestion might be that a revised form of these systems may exist if hardware and software prices continue to decline.

A distinction must now be made. While many federal and state governments have been committed to computer applications for many years, libraries have generally been newcomers to the applications of computer technology and have really come to embrace it only in the last decade. This indeed may be to their advantage as the new generation of computers have many more options and power than their predecessors. The major obstacle has been, and continues to be, the high costs of hardware, programming, and software maintenance.

Like many information centers, libraries have initially embraced computer technology to control their collections bibliographically, i.e. by call number, author, title, etc. This method has significant deficiencies for geoscientists interested in regions not covered by some geographical classifications and many, if not most, researchers are unaware of particular authors or titles.

COORDINATE SEARCHING –

There continues a strong voice within the cartrographic community that coordinate indexing and searching is the answer to accurate location of geographic information. Despite these beliefs among researchers and information specialists alike, coordinate searching and retrieval continues to be a frustrating problem. GeoRef's problems were recently outlined by Stark (1) and the "guessing" of coordinates within the OCLC library system continues to frustrate users and catalogers alike.

Before coordinate searching will ever be successful there must be a concerted effort to develop standardized coordinates for all of the world's political divisions, their administrative divisions, cities, geographical features and geological formations. Similar to the current U.S. "state cutter list program," (2) such standardization requires a great deal of cooperation and a central clearinghouse such as the national library.

Effective coordinate searching suggests that someone perform multi-level cataloging, meaning that not only is the whole set referenced but each of its component parts such as individual sheets for set and series maps. This means that each country's topographic sets would have to be cataloged by their individual sheets if coordinate searching and indexing is to be truly accurate in the future. The obvious question is whom, or what institution/library has the current resources to index all of its maps in this way so that such a search will retrieve individual large-scale sheets?

TRADITIONAL VIEWS –

If automation has come slowly to libraries, it has come at a snails pace to the administration of map collections. Libraries, and their directors, continue to be very book-oriented with many special collections, not just maps, suffering because of it. Maps continue to the step-child to many libraries as do government document collections, music collections, special languages, etc.

Similarly, many libraries are participants in national online databases but are neither contributing their map holdings nor taking advantage of other holdings already available to them. Phinney (3)

stated in 1983 the value of cataloging the map collection at the Colorado School of Mines. Having noted the significant circulation increase, he makes his most important point by stating: "Researchers in the near future will be using desk top terminals and ordering materials without physically visiting the library. He continues by warning: "Collections not in these data bases will be missed."

Let me remind you that his future is here today: researchers are using remote terminals to query library holdings, checking out materials, and having them delivered to their offices without ever walking into the library.

Despite the availability of such systems, access to cartographic material in the United States continues to be a vexing problem as evidenced by a recent study completed by the American Library Association Map & Geography Round Table. The *Guide to U.S. Map Resources* (4) shows that of 919 libraries, only 55% of them catalogued their maps. As suggested earlier, few libraries – only 25% – took advantage of the two large bibliographic utilities in the U.S. for improved map access and control. Perhaps not surprising then is the fact that only 5% of these map collections had an online catalog.

In addition, this study revealed that only 45% of the libraries circulated their maps and only 32% participate in interlibrary loan. Management decisions affecting circulation and interlibrary loan are not always easy and must take into account the parent library's role, their predicted need for each map acquired and the "wear and tear" on the materials themselves. The point to be made is that access to cartographic information is more than software and hardware and decisions made by one library often affects many others. We must we realize that we are all members of a community whose boundaries extend far beyond our own library's walls. Gone is the day when we can acquire all of the material required by our varied users. Today we must continue to maintain our strengths, recognize our weaknesses, discover other's strengths and share, not only our expertise, but also resources in order to manage the future development of cartographic information.

First of all, not every collection should immediately cancel all plans for a local system and rush out to join a national database nor am I criticizing any of the local systems in use presently. It becomes unfortunate, however, when a local system is developed at the expense of a national data base because both systems suffer. The national database loses the local input and the local system does not take advantage of information already available.

A point is eventually reached when a library realizes it is cost-efficient to use information from a national database rather than create its own and/or maintain the cost of equipment, staff and maintenance. Participating in another system quite obviously means you must compromise. You must accept their theasaurus, their limited field lengths, their subject headings or minimum level standards to name just a few.

Nevertheless, the fact remains that we adopt the national system since more because it would cost us far more to develop and maintain anything comparable. The key then is to develop a local system that simply "massages" information from a national database to meet some of the local needs. This is seldom accomplished unilaterally by a map collection but usually in concert with the parent organization and its additional staff support.

UNIVERSITY OF ILLINOIS EXAMPLE –

The University of Illinois Map & Geography Library is one of the largest collections of cartographic materials in North America with over 360,000 maps, 150,000 aerial photographs and approximately 15,000 volumes including subscriptions to over 600 serial titles. The late 1970's saw the entire University Library, with over 6 million volumes, develop an online circulation system. Fortunately, the Map & Geography Library was included and its entire card file was also converted to a machine readable data file. Mind you, this involved no recataloging of materials but very simply a key-punching conversion of cards to an online control.

Technically, the map collection had been 100% cataloged and classified with cards for each title. It did not take long to realize, however, the numerous changes in cataloging practice. Although the Library Circulation System already provided access by author, title and call number, with subject access being planned for a new online system, it remained inadequate since AACR II had introduced so many changes. Therefore, a proposal was submitted to the U.S. Office of Education Title II-C program for improved bibliographic control for the entire map collection and acquisition of large-scale mapping of Latin America.

The University of Illinois' committment to the OCLC database was unquestioned and made the decision for us as to which system to use. It would also have been our first choice since ti includes significantly more map records than any other. On June 1, 1987 there were a total of 186,165 map titles to be found in OCLC. The Library of Congress Geography and Map Division contribution to the system was 104,561 and member libraries had input an additional 79,950.

The major problem faced by most map collection is not the control of single maps but rather bringing together the multi-sheet "set" of maps. We not only wanted online searching but also online circulation. The local system also allows the searcher to perform a "shelf-position-search" which groups fifteen records above and below your specific query as if they were all filed in the same map drawer. As seen in Figure £1, you can then search any of the individual lines to get further information. The information provided is in a brieflisting format which highlights item call number, author, title, loan periods, location, and availability. Additional information, such as usually seen on a library catalog card, will be available in a separate subject retrieval system referred to earlier.

FIGURE 1 – Shelf-Position-Search

```
SPS/G53701945.U5
11 G53501973.A7/ARGENTINE / MAPA DE LA REPUBLICA ARGENTINA/1973
12 G53501981.I5/INSTITUTO / REPUBLICA ARGENTINA/1981
13 G5351.P2SVAR.A9/AUTOMOVIL / HOJA DE RUTA/195-
14 G5351.P5SVAR..A7/ARGENTINA. / CARTAS HIDROGRAFICAS/1901
15 G53701945.R4/ / LA REGION SERRANA Y BALNEARIA/1945
16 G53701945.U5
17 G53701945.U7/URUGUAY. C / MAPA TURISTICO DEL SECTOR/1945
18 G53701950.U7/URETA MART / MAPA DE LA REPUBLICA/1950
19 G53701974.U5/U.S. CENTR / URUGUAY/1974
1A G53701981.U7/URUGUAY. S / CARTA REGIONAL DE LA REPUBLICA/1981
1B G53701983.U7/URUGUAY. S /REPUBLICA ORIENTAL DEL URUGUAY/1983
  PAGE 2      INPUT:G53701945.U5DSL/17
G53701945.U7    URUGUAY. COMISON NACIONAL DE TURISMO.
MAPA TURISTICO DEL SECTOR SUR-OESTE DEL URUGUAY$ MONTEVIDEO
NOLC      2069353    1945        1    ADDED:  790825    NENG
01       001 1W      MAX
PAGE 1 END/DSL/1B
G53701983.U7     URUGUAY. SERVICIO GEOGRAFICO MILITAR.
REPUBLICAS ORIENTAL DEL URUGUAY, CARTA GEOGRAFICA$  MONTEVIDEO
      3111255     1983        1    ADDED:  860316    NENG
01       001 1W       MAX
PAGE 1 END
```

Again, through manipulation of the OCLC national system we can provide a complete listing of multi-sheet sets. OCLC provides a holdings statement which allows its members to list individual holdings for small sets or for large sets using a contiguous numbering scheme. For example, a set with a numbering system of 1 – 256 can simply be listed in that manner, however, if 256 sheet names or odd numbering had to be input, OCLC only provides approximately three lines on the computer screen for this activity. These unusual sets are them input locally by our library Automated Records Maintenance Unit – note the need for this activity. These unusual sets are then input locally by our library Automated Records Maintenance Unit – note the need for additional support personnel!

FIGURE 2 - Partial Holdings Printout

```
DSC/G5370S100.U7
G5370S100.U7   URUGUAY. SERVICIO GEOGRAFICO MILITAR.
URUGUAY 1:100,000 $MONTEVIDEO
NOLC      1919663    1971          1    ADDED:  790526    MSET
01 MAX 001 1W                     97
02 MAX 001 1W                     96
03 MAX 001 1W                     95
04 MAX 001 1W                     91
05 MAX 001 1W                     90
06 MAX 001 1W                     89
07 MAX 001 1W                     88
PAGE 1 MORE ON NEXT PAGE.  ENTER PD2PD2
11 MAX 001 1W                     87
12 MAX 001 1W                     86
13 MAX 001 1W                     84
14 MAX 001 1W                     83
15 MAX 001 1W                     82
16 MAX 001 1W                     81
17 MAX 001 1W                     80
18 MAX 001 1W                     79
19 MAX 001 1W                     78
20 MAX 001 1W                     77
PAGE 2 MORE ON NEXT PAGE. ENTER PD3
```

The importance of this display can be seen in Figure £2 where we see a partial printout of our Uruguay 1:100,000 collection and availability. Indeed, if you were fortunate enough to have an index of this set in front of you the researcher could query the system for an individual sheet such as No. 84 with the resulting response seen in Figure £3.

FIGURE 3 - Individual Sheet Holdings Printout

```
DSC/G5370S100.U7,B=84
G5370S100.U7   URUGUAY. SERVICIO GEOGRAFICO MILITAR.
URUGUAY 1:100,000 $MONTEVIDEO
NOLC      1919663    1971          1    ADDED:  790526    MSET
01 MAX 001 1W                     84
PAGE 1 END
```

The decision to provide holdings for large sets, while philosophically a good one, has created real problems with holdings statements for the large sets such as Germany 1:25,000, Canada 1:50,000, Finland 1:20,000 or the U.S. Geological Survey's topographic maps of the United States. The CRT screen can only display so many holdings and how many screens does a researcher wish to search? Also, does the searcher know what any of those sheet numbers refer to or what geographical area it covers? The German 1:50,000 topographic survey includes over 500 maps which would require a search covering 50 screens! Who would search that many and for what? Wouldn't it be more economical to use the actual index sheet to locate the specific geographical area, its sheet number, and the library's holdings?

Because we have the information stored and the "number-crunching" hardware and software does not always mean it may be the most economical alternative. What is needed is a graphics index which would be available optionally each time a searcher retrieved a multi-sheet map title. As seen in Figure £4, the searcher could request the index option and the sheet coverage would be shown as in this example from the Edinburgh University GIMMS Mapping System. Until the development of some similar graphics format, the University of Illinios has decided to limit our holdings statements to include sheets from sets less than 100 in number. If the holdings are larger than 100 sheets the statement "For holdings contact the Map & Geography Library," as seen in Figure 5 will appear on the screen. While experiments with a graphics index format continue, we will rely on the traditional index sheet for the larger sets.

FIGURE 5 - Generic Holdings Statement

```
DSC/G8960S250.A91
G8960S250.A91     AUSTRALIA. DIVISION OF NATIONAL MAPPING.
AUSTRALIA 1:250,000 TOPOGRAPHIC SURVEY$ QUEANBEYAN  78-695659
        3039754    1975        1 ADDED: 850929            MSET
01 MAX 001 1W         FOR HOLDINGS CONTACT MAP & GEOGRAPHY LIBRARY
```

Thus, the University of Illinois will finish the decade with an online circulation system which will provide data by call number, author, title, geographic area, subject, and include information on the number of sheets for most titles, number of copies, their location and availability. Because the LCS system is available statewide, it means a user can query the local system for a particular map, choose the item needed and check it out while never leaving Chicago 135 miles away! This will not happen in the future – it is happening now!

REFERENCES

1. Stark, Marilyn. "GeoRef Coordinates Searching: Panacea or Problem," *GIS Newsletter*, 98, Feb. 1986, p. 8.
2. Map collections in the United States are working with the Library of Congress Geography and Map Division to develop a standardized list of area cutters for cities and regions in each state to aid automated searching in the future.
3. Phinney, Hartley K. Jr. "Map Accessibility," *GIS Newsletter*, 85, Dec. 1983, p. 5.
4. Cobb, David A., ed. *Guide to U.S. Map Resources*. Chicago: American Library Association, 1986, p. xiv.

58-GEO-2-E

CARTO-NET: GRAPHIC RETRIEVAL AND MANAGEMENT IN AN AUTOMATED MAP LIBRARY

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ABSTRACT

CARTO-NET is a fully-functioning, automated map cataloguing and retrieval system, designed as a further cartographic enhancement to the UK MARC format. Using CARTO-NET, complete bibliographical control of all maps can now be achieved. The majority of map records have previously been difficult to automate because the map sheets were part of a series. (90% of all published maps belong in this category.) Cataloguing follows Anglo-American Cataloguing Rules [AARC2] and Stibbe's manual of interpretation for cartographic materials [AARC2(CM0].

Graphic index diagrams showing map coverage, the map librarian's traditional tool for map cataloguing and searching, have been automated to allow the reader (using an on-screen cursor) to indentify his broad area of interest on a world map background. The continuous zoom facility enlarges a specific area, giving more background detail; this process can be continued until the search window is accurately defined.

CARTO-NET can be linked with other geographically-referenced data sets such as gazetteer entries, air photographs and satellite imagery. There is potential for a very powerful, integrated information retrieval system to be established.

Cataloguing of all map sheets will be a major, but worthwhile task since it will enable map collections to be used more fully. The British Library is supporting a feasibility study to set up a co-operative map cataloguing network within the UK to avoid duplication of data input. International telecommunication standards are being observed so that the network can be extended overseas beyond the UK at a later date.

INTRODUCTION

The CARTO-NET project began in Scotland some seven years ago in the Map Library of the Department of Geography, University of Edinburgh. Since 1985 the project has been funded by the British Library Research and Development Department because CARTO-NET is seen as a solution to the problem of complete bibliographic control of maps which are part of a series. (90% of all published maps belong to this category).

A new project has just begun to study the feasibility of setting up a co-operative cataloguing network in the United Kingdom. The effort required to catalogue map collections of over one million different maps is immense. There is little point in individual maps being entered more than once in the system by different libraries. We are investigating the setting up of an organisation in which libraries will enter previously agreed blocks of maps in CARTO-NET and exchange the records with other institutions. The results of this research will be available in the Summer of 1988.

CARTO-NET table structure

CARTO-NET does not use special-purpose library software because map cataloguing has very specific requirements, not normally catered for in retrieval systems designed for book material. Instead, it uses ORACLE which is a general-purpose, 4th generation relational database management system (RDBMS). Information about map sheets (e.g. the geographical limits and sheet numbers) can be interfaced with graphics software to generate the map librarian's traditional tool, the graphic index or cover diagram. ORACLE also allows CARTO-NET map records to be linked with other geographically-referenced data such as gazetteer entries, air photographs and satellite imagery. Any library which is on a national or international computerised network system has the opportunity to access this very powerful integrated information retrieval system.

Map catalogue information in CARTO-NET is held in an hierarchically-structured set of tables. This arrangement saves storage space in the database, since almost 50% of the information about a map which is part of a series can be held in the SERIES table and does not need to be repeated for each individual sheet. Information about individual sheets is held at a Second Level in the SHEETS and MAPLIMIT tables, while data about individual sites holding map, such as shelfmark and accession data, are held in the LOCAL table. Many of the catalogue fields have VALIDATION and VERIFICATION facilities to ensure quality control of data input. Cataloguers have access to extensive on-line SYSTEMHELP information on every field which incorporates Anglo-American Cataloguing Rules (AACR2) and the UK MARC format, where it is applicable to maps. On-line LOCALHELP is also available for individual map libraries using the CARTO-NET system.

Functions and facilities in CARTO-NET

CARTO-NET is a fully-functioning, automated map cataloguing and retrieval system with the following facilities:

CATALOGUING

Data can be entered in a variety of ways:

a) Downloaded from MARC tapes
b) In bulk, in other machine-readable formats
c) Interactively, via a visual display unit screen (VDU)
d) By digitising the geographical limits of individual map sheets from existing, traditional paper graphic indexes

CENTRAL DATABASE

Data is held in ORACLE, a 4th generation Relational Database Management System. ORACLE has sufficient flexibility to accommodate the complexities of map cataloguing and retrieval.

INTEGRATING DATA FROM OTHER SOURCES

Other ORACLE tables to which the user has access can be linked to the map catalogue (e.g. gazetteer and air photograph information). This increases the range of geographically-referenced searching which can be undertaken.

GRAPHIC OUTPUT

Results from ORACLE can be interfaced using GEOLINK with the GIMMS software package to draw automated index diagrams. Trials have shown that users prefer to search for maps, in the first instance, by area. the GEOZOOM facility will call up a map of any part of the world on screnn. The user can then ZOOM in to (enlarge) the area of

interest and generate short catalogue records and selective index diagrams of maps which satisfy the query.

TEXTUAL OUTPUT
Reports from a search can be printed in any specified format. Complete or partial catalogue records may also be produced in UK MARC format, or in any other format which is required. Accessions Lists may be generated automatically. A Loans System may also be linked to CARTO-NET, if desired.

The CARTO-NET Main Menu
Total flexibility of searching is achieved either by a conversational menu system using GEOLINK or by using the graphic front-end (GOEZOOM). The menu was designed in consultation with a wide range of map libraries in the UK to answer their most frequent queries. The menu options are user-friendly ways of interrogating the catalogue records held in the CARTO-NET database (Figure 1). CARTO-NET is still under development, so suggestions for additional search routes are welcome. Experience gained so far with users shows that graphic searching is the preferred route into the database. Users who become expert in the use of the SQL language used by ORACLE may use Option 18 (General Purpose Search) to construct their own search of the catalogue. SQL is the recommended American Standard (ANSI) database query language.

CARTO-NET Secondary Menu. Option 10 (Utilities)
SHORT CATALOGUE ENTRY
Many smaller libraries will not require the full catalogue record generated by CARTO-NET. (A full record could consist of almost 200 catalogue fields.) Option 1 (Create a view for short catalogue entry) allows the user to select a much smaller number of fields to produce a short catalogue record.

CATALOGUING
On-line cataloguing is carried out by entering data in a set of specially designed screens. At Series Level, the fields are grouped according to the UK MARC format, beginning with Control Fields and moving through the Bibliographical Description and Headings to the Coded Data Fields. All the fields which are "mandatory" in the Recommended Standard for bibliographical records exchanged in the UK national network have been included, where they apply to maps (Reference: UK MARC Manual, Appendix N, June 1986). Many "recommended" fields have also been included. Special commands have been incorporated in the screens to force data entry in certain fields. These commands are also used to reduce cataloguing effort by copying down fields which are required to be entered more than once.

One-line HELP is available for quick reference on every field in CARTO-NET. Less experienced cataloguers can consult the more extensive on-line help which is provided in the SYSTEMHELP table, where many examples are included (Figure 2). The UK MARC manual has been reinterpretated for series map cataloguing by combining British Library Map practice, the rules in AACR2 (CM) and the format already laid down in the UK MARC Manual.

SCREEN EDITING
Catalogue records may be updated or queried through the screen editor.

PRODUCTION OF COMPLETE CATALOGUE RECORDS
Option 3 (Access a complete record) allows the user to generate a complete catalogue record of all or any of the map sheets within a given series. These records can then be used for exchange with other institutions or for the production of a complete or partial catalogue on tape, disk or microfiche.

The example given (Figure 3) is a complete CARTO-NET record, UK MARC compatible at SERIES level, of SHEET K-O (a 1:1,000,000, Operational Navigational Chart of The Gambia). This record also includes detailed information about the individual sheet within this World series.

Graphic searching
The traditional method of searching for maps which are part of a series has been through the medium of the graphic index or cover diagram. These diagrams tend to become illegible with long use as information about new editions of map sheets is added by hand (Figure 4). A great deal of potentially useful information about a map sheet cannot be displayed on such a manuscript diagram. CARTO-NET provides facilities to generate diagrams combining a much wider range of data, so making much fuller use of a map collection. The geographical co-ordinates of all four corners of regular map sheets are recorded in CARTO-NET and used to generate selective graphic indexes or cover diagrams. Facilities for handling irregularly-shaped maps are also provided. A graphic search in CARTO-NET can integrate, on a single diagram, all possible cover diagrams for a particular area. The user may then ZOOM in to pick up more background detail to specify the query more closely, by a particular range of scales or publication dates or any other combination of criteria. Graphic indexes at a very wide variety of scales can be generated using the GIMMS, GEOLINK and GEOZOOM software developed in Edinburgh (Figure 5). CARTO-NET can currently use the CIA's World Databank II (digitised at scales of between 1: 1,000,000 and 1: 3,000,000) and more detailed digital outlines of Great Britain, including those at a scale of 1: 625,000, available from the Ordnance Survey. Detailed digital databanks of other countries could be used as background, if required. Constructing and executing queries and building up index diagrams can easily be accomplished by users who know nothing of ORACLE, SQL, GIMMS or GEOZOOM.

A CARTO-NET selective graphic index
The example (Figure 6) is of Africa, showing international boundaries (scale 1:50,000,000), with rivers and place-names of larger countries and the few map sheets which have been entered in CARTO-NET. The Transverse Meracator projection distorts the sheet-lines. There are distinct problems here, as in manual cartography, in deciding on the amount of background detail to display at various scales. Some work has already been done in Edinburgh on the World Databank II coast and river outline to give denser detail as the user zooms in to a larger scale.

Following on from the above example, CARTO-NET allows the user to ZOOM into a chosen "window" in North Africa (Figure 7). The result is that more place-names with capital cities appear and also more rivers, even in the desert. Further research is required to develop a "rule-based" system. This would govern the display of place-names, rivers and grid lines according to the final size of the diagram and the density of maps retrieved. by using QUIT, the area of search from which map cover is to be displayed is registered within the database. The co-ordinates of the search window are then matched against the co-ordinates of maps held within CARTO-NET. The maps which lie within the chosen area, and fulfil the other search conditions such as scale or publication date, are displayed on a selective graphic index, either on a VDU-screen or on a graphic plotter.

Listing of short catalogue records of retrieved sheets
These contain sufficient information for the reader to identify the map sheets, but do not give full catalogue record. The query is stored and can be subsequently edited and rerun if other map sheets are required.

Links with other datasets
The ORACLE RDBMS allows users to link their tables of data to those of other users. For example, it is possible to JOIN the World Gazetteer Database (which includes economic and cultural data and is held in the Department of Geography) to the map catalogue and to data on air photographs and satellite imagery. This JOIN will produce a very wide-ranging search of geographically-related information.

Air photograph retrieval
By using an on-screen menu, it is possible to search for maps or photographs which lie a specified distance from a line. This can be particularly useful for civil engineers planning the course of a new road. The example (Figure 8) shows a 5-km band on either side of the M6 motorway in Northern England. A "box" search for photographs around the Cambridge area can be specified accurately by zooming in, using a Grid Reference to identify the area required until background detail of the Ordnance Survey 1:625,000 digital outline of the UK is shown on the screen. Background detail can be switched off and on using a subsidiary menu. Options are Grid, Coastline, Rivers, Administrative Boundaries, Motorways, Roads, Cities, Large Towns, Towns/Villages and Other Built-up Areas.

It is this hierarchy of detail which has already been established for the Ordnance Survey background which still needs to be applied at a World scale.

The photographs retrieved for the Cambridge area show a great density of cover. If the user requires only photographs which cover the town, a further ZOOM will allow the extra prints outside the town boundary to be removed from the screen for clarity (Figure 9). This facility to graphically suppress photographs not required will shortly be available for map searching.

Other ways of searching
Many map library queries are subject-based, for example by Geology. The British Library subject headings used by CARTO-NET distinguish only a small number of subsidiary subjects within Geology such as Geochemistry, Geomorphology, Geothermal energy and Glaciology.

When CARTO-NET was installed earlier this year in the Map Library of the British Geological Survey, more detailed subject headings were requested. Withing Geomorphology alone some 80 subsidiary subjects were required. There is no difficulty in building in special validation codes for special libraries. On-line help and validation is provided for cataloguers so that they can choose the correct term when entering data.

Special data input and retrieval screens can be designed for particular users although compatibility will still be maintained within the database with already established international standards to allow networking and exchange of catalogue records. For example, it is planned that the British Geological Survey will enter only geological map records and exchange them for records of topographic mapping entered in other institutions elsewhere in the UK.

Testing CARTO-NET

The CARTO-NET Map Cataloguing and Retrieval system is under evaluation at the following sites:

University of Manchester
University of Reading
Portsmouth Polytechnic
Overseas Surveys Directorate, Ordnance Survey
National Library of Scotland
The British Library
University of London, King's College
Open University
British Geological Survey

Good relations have been established with these organisations during the course of the CARTO-NET project. These sites will form the basis of the network feasibility study.

Conclusion

CARTO-NET is now in a sufficiently complete state for outside users to access the system and examine the records already catalogued in it. "Read-only" access is available so that inexperienced users will not damage or destroy records. Comments on the functionality of CARTO-NET are very welcome. Messages may be left on the CARTO-NET NEWS BULLETIN.

Access to CARTO-NET is by three routes:

1) the Joint Academic Network (JANET)
PAD›CALL 000016000015
2) ıthe Packet Switching Service (PSS)
The Edinburgh number is 234231354354
The passwords are GUEST, FRIEND followed by CALL GEOVAX
3) a telephone Modem link to the Department of Geography, University of Edinburgh
Tel: 031 557 2591

Once the access has been gained to the Geography Department VAX 11/750 computer, follow the prompts to enter CARTO-NET:

Username:BLNEWS
Password:BULLETIN
$ CARTONET

If any organisation wishes to become involved in the networking feasibility study, please contact:

Mrs B A Morris
Department of Geography
University of Edinburgh
Drummond Street
Edinburgh EH8 9XP
Tel. 031 667 1011 ext. 4391

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CARTO-NET - Main Menu
Options currently available
1 – Graphic searching
2 – Search by National Grid for U.K. [box or point]
3 – Search by Latitude/Longitude [box or point]
4 – Search by Country, Scale (and Date)
5 – Search by Urban area, Scale (and Date)
6 – Search by Subject
7 – Search by Shelfmark
8 – Search by Interest
9 – Search by Topographic Feature [from Gazetteer]
10 – Search by Town name [from Gazetteer]
11 – Search by Series
18 – General Purpose Search
19 – Utilities
20 – Quit from search

Figure 1 CARTO-NET Main Menu

256 Mathematical data area (cartographic materials)

256.00$a SCALE_DATA (M) 60 char
Mathematical data. Statement of scale [Ref: AACR2 (CM) 3B1]. Give as a representative fraction expressed as a ratio (1:) preceded by the word Scale (which is always written in English, even when dealing with foreign maps). Give the scale even if it is recorded as part of the title, or other title information. Spaces, not commas, are used to separate groups of three digits. Where the scale is not stated but calculated by the cataloguer, the ratio is enclosed in square brackets [ ]

EXAMPLES:

(UK MARC Example follows AACR2)
Scale 1:250 000
256.00$aScale 1:250 000#

Calculated scale
Scale [1: 1 000 000]
256.00$aScale [1:1 000 000]#

Multipart item (e.g. a map series) with two scales
Scale 1:100 000 and 1:200 000
256.00$a1:100 000 and 1:200 000#

Multipart item with three or more scales
Scales differ
256.00$aScales differ#

256.00$b SCALE_INFO (R) 60 char
Mathematical data. Additional information on scale. Verbal statement of scale or qualifying information. When quoting directly, enclose in "..." [Ref: AACR2(CM) 3B1].

EXAMPLE:-
Scale 1 in. to 1 mile

EXAMPLE:-
"Along meridians only, 1 inch=936 statute miles"

Figure 2 SYSTEMHELP

CARTO-NET

```
MARC TAG                    SERIES level

Control fields
NME       SERRCN :          99
NME       SINGLE_ITEM :     N
NME       SERIES_MARC :     Y

Title and statement of responsibility area
NME       TITLE_TYPE :      N
245.10    TITLE_ACCESS :    1
245.10    SKIP_CHARS :      0
245.108a  SERIES_TITLE :    Operational Navigation Chart, series ONC
NME       SERIES_DESIG1:    ONC

Mathematical data area
256.00    SCALE_IND :       0
256.008a  SCALE_DATA :      Scale 1:1 000 000

Publication, distribution, etc. area
260.10    PUB_HEADING :     1
260.108a  PLACE_OF_PUB :    St. Louis, Mo.
260.108a  PLACE_OF_PUB :    [London]
260.108b  NAME_OF_PUB :     Defense Mapping Agency, Aerospace Center
260.108b  NAME_OF_PUB :     Director of Military Survey
260.108c  YEAR_OF_PUB :     [1966-]
260.108d  ADDRESS :         St. Louis Air Force Station, Missouri
                            63118, USA

Physical description area
300.008b  COLL_ENRICHING:col.
300.008n  COLL_DESIG :      map

Corporate name main entry heading
110.10    CORPNAME_TYPE :1
110.108a  CORPNAME :        United States
110.108c  SUB_BODY :        Defense Mapping Agency
110.108C  SUB_BODY :        Aerospace Center

British Library Map Library subject heading
653.008a  PLACE :           World
653.008j  SUBJECT1 :        Aeronautics
653.008k  ITEM_TYPE :       Maps

Corporate name added entry heading
710.11    ACORPNAME_TYPE:1
710.11    CHEADING_TYPE :1
710.118a  ACORPNAM :        Great Britain
710.118c  SUBNAM :          Ministry of Defence
710.118c  SUBNAM :          Director of Military Survey

Information codes
008    $a NATURE_OF_PUBL:m
008    $b COUNTRY_OF_PUB:us
008    $p MATERIAL :        A
008    $l LANG_CODE :       eng

Relief, projection and prime meridian codes
031.008a  RELIEF_CODE1 :    a
031.008a  RELIEF_CODE2 :    b
031.008a  RELIEF_CODE3 :    c
031.008a  RELIEF_CODE4 :    g
031.008a  PROJ_TYPE :       co
031.008a  PROJ_PROPERTY :a
031.008a  PRIME_MERID1 :    aa

Scale and coordinates coded information field
034.10    SCALE_IND :       1
034.108a  SCALE_TYPE :      a
034.108a  SCALE :           1000000

NME       no MARC equivalent but required to operate CARTO-NET
```

```
                    SHEET Level

Control fields
SERRCN :          99
SHTRCN :          1441

Title and statement of responsibility area
SHEETNO :         K-0
SHEET_TITLE :     The Gambia, Guinea, Guinea Bissau, Mauritan
                  Republic of Cape Verde, Senga1
AGENCY1 :         Defense Mapping Agency Aerospace Center

Edition area
ED_STATEMENT :    4th ed.

Mathematical data area
PMERID :          aa
GRID1 :           tn

Publication, distribution, etc. area
IMPRINT :         St. Louis : Defense Mapping Agency Aerospace
                  Center
PUB_DATE :        1964
MAGVAR_YEAR :     1975
PRINTMONTH :      3
PRINTYEAR :       1976

Physical description area
DIMENSIONS :      90x125cm.
ENRICHING :       col.

Subject/content area
SUB1 :            Aeronautics
URBAN1 :          Dakar
URBAN2 :          Banjul
URBAN3 :          Saint Louis
URBAN4 :          Kaolack


                  MAPLIMIT Level

SERRCN :          99
SHTRCN :          1441
INSETNO :
ITITLE  :
ISCALE  :
WESTLONG_CP  :    w
WESTLONG_DEG :    27
WESTLONG_MIN :    0
WESTLONG_SEC :    0
EASTLONG_CP  :    w
EASTLONG_DEG :    14
EASTLONG_MIN :    50
EASTLONG_SEC :    0
NORTHLAT_CP  :    n
NORTHLAT_DEG :    18
NORTHLAT_MIN :    10
NORTHLAT_SEC :    0 .
SOUTHLAT_CP  :    n
SOUTHLAT_DEG :    10
SOUTHLAT_MIN :    0
SOUTHLAT_SEC :    0


                  LOCAL Level

SERRCN :          99
SHTRCN :          1441
OWNER  :          EUGD
COPIES_FOLDED :   1
COPIES_TOTAL :    1
ACQ :             Donation MCE
DATE_ON_FILE :    20-OCT-86
SHELVING_SYSTEM :GSGS 5307
SHELFMARK :       81(  )
```

Figure 3 A complete CARTO-NET map catalogue record

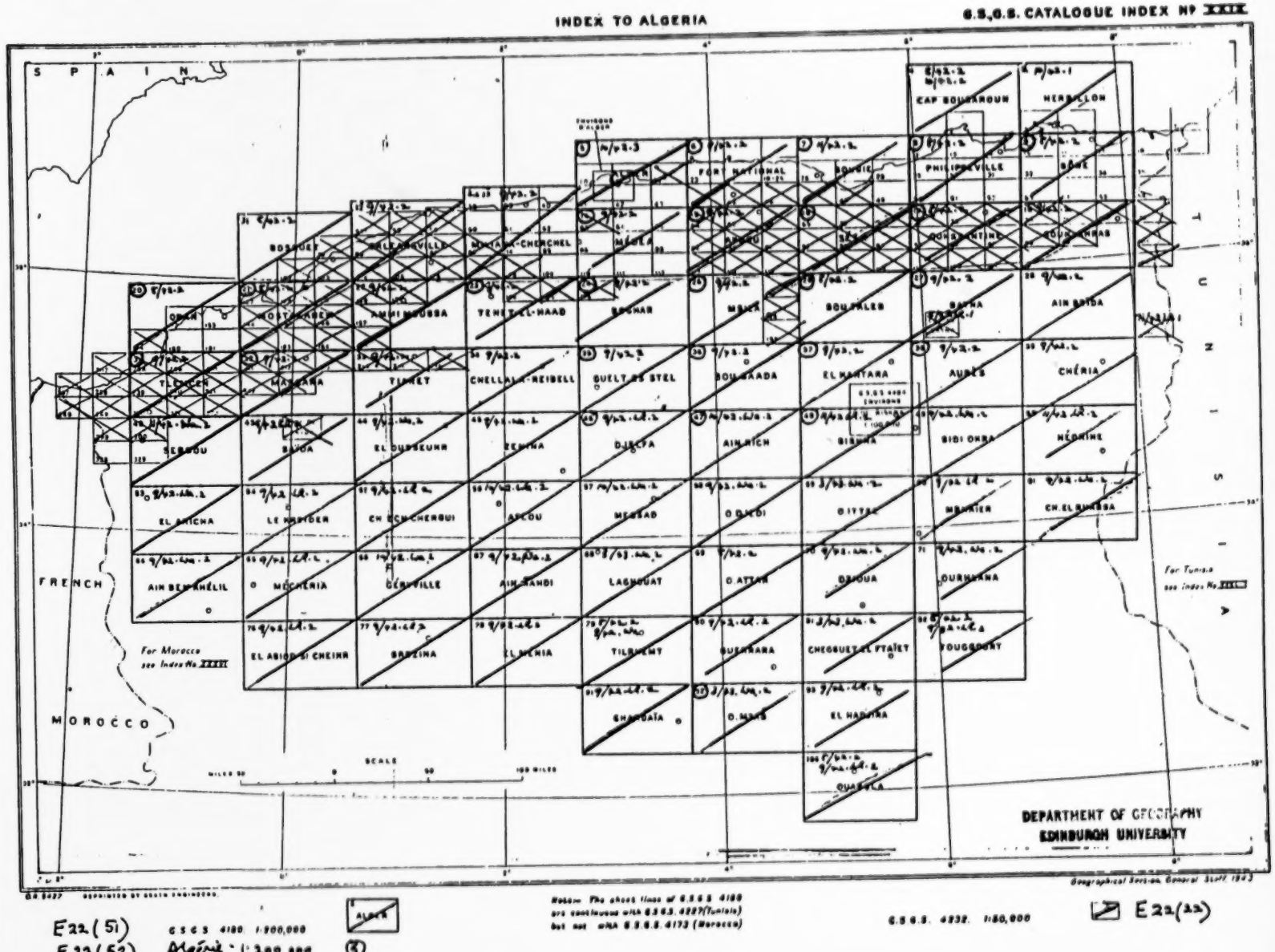

Figure 4 A manually-maintained graphic index

CARTO-NET

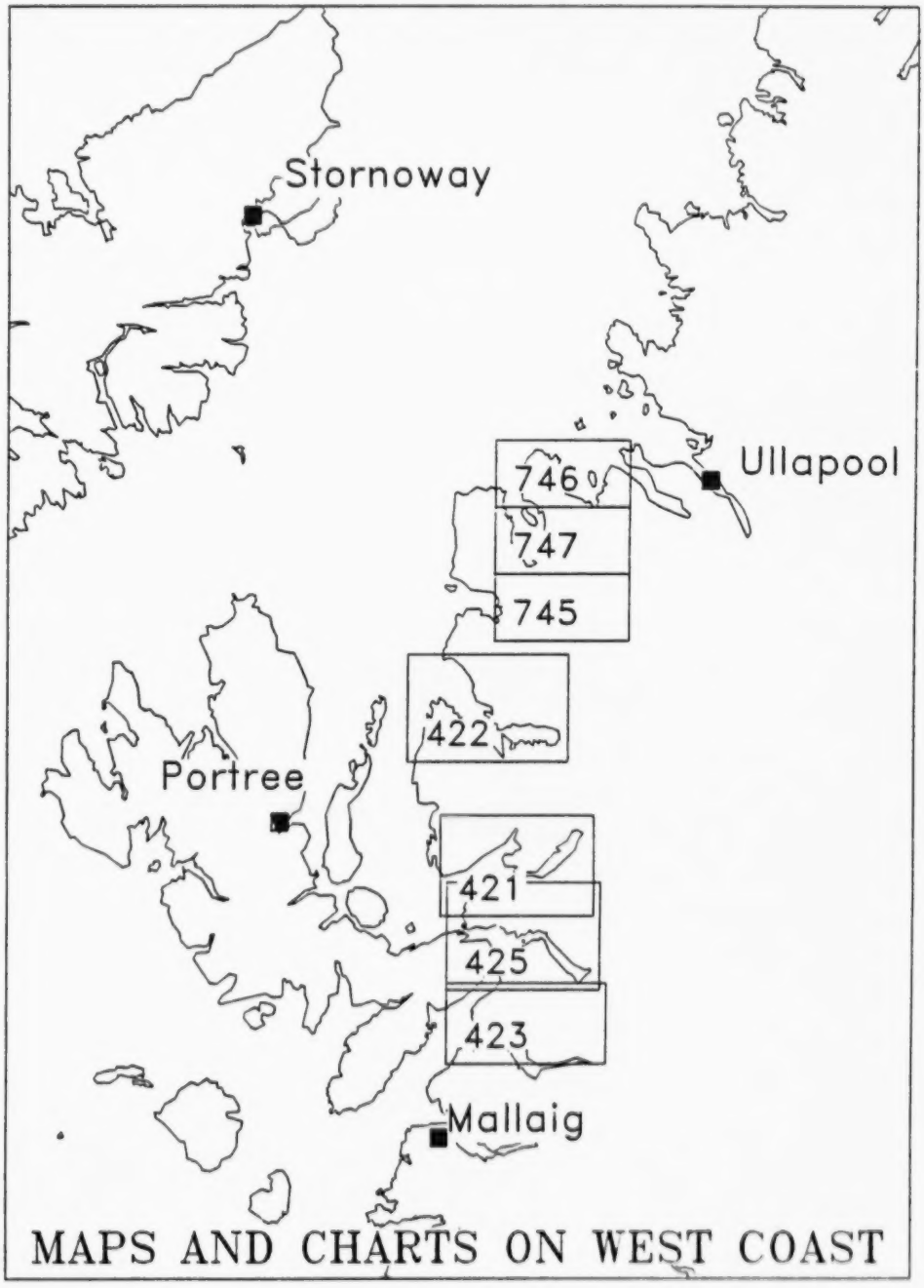

Figure 5 A CARTO-NET selective graphic index of maps held in both the National Library of Scotland and Edinburgh University Geography Department

CARTO-NET

22-23

Figure 6 A CARTO-NET graphic index of maps of Africa using GEOZOOM

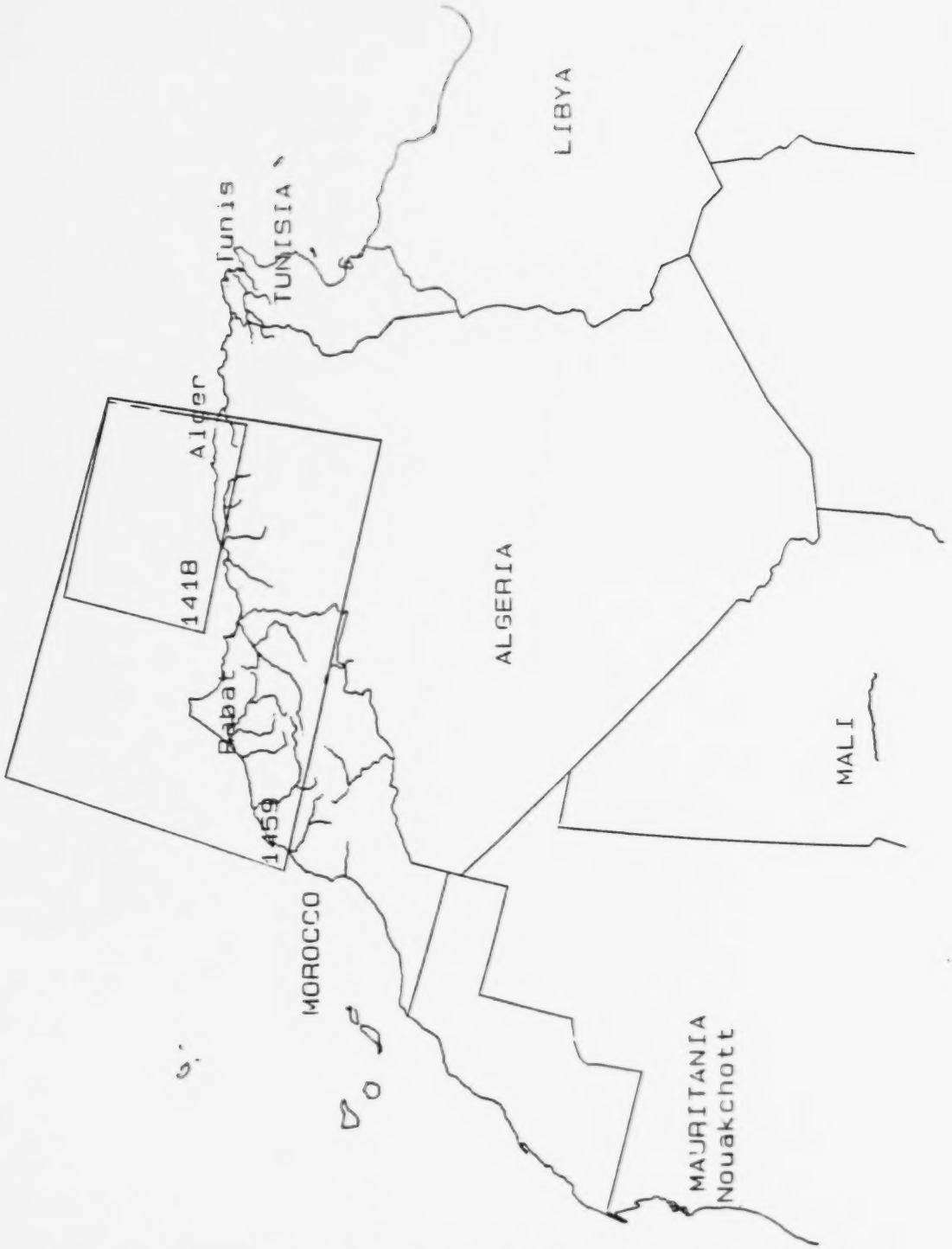

Figure 7 A ZOOM into a "search window" in North Africa

CARTO-NET

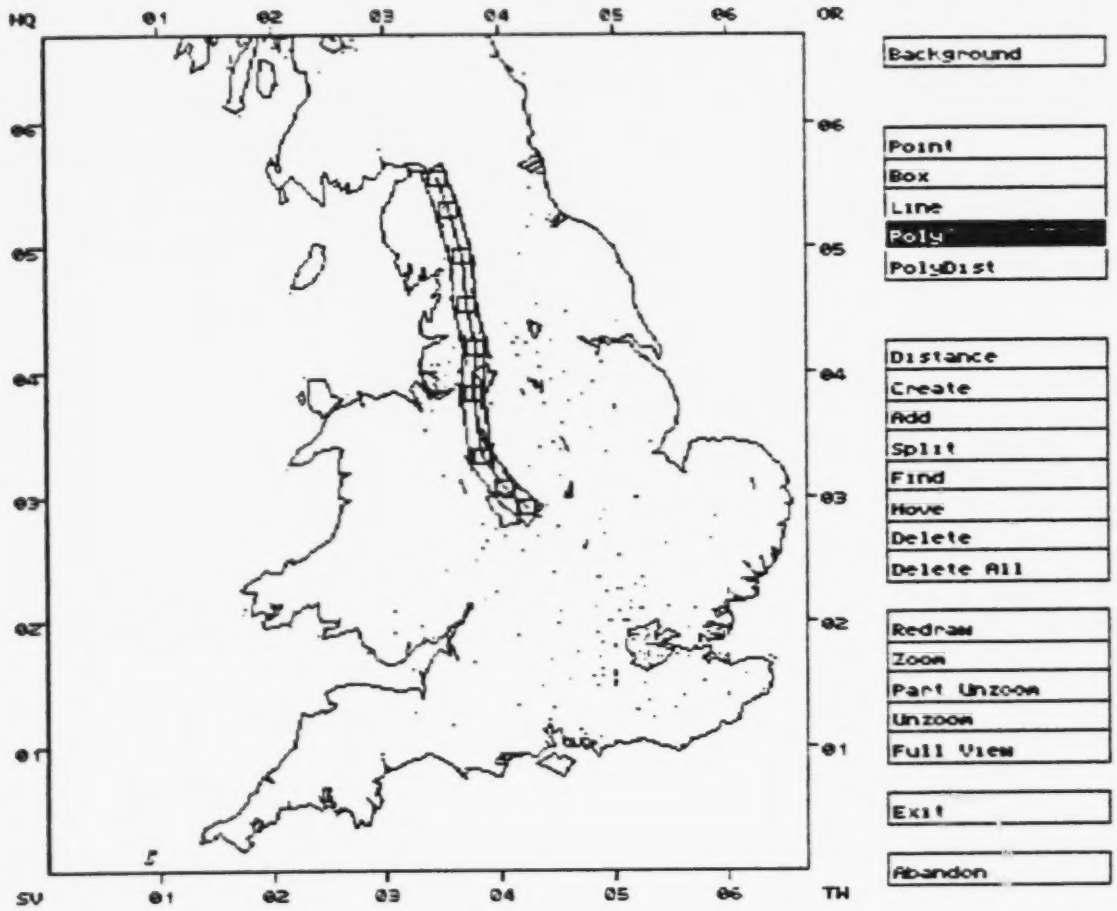

Figure 8 A graphic search for air photographs 5km on either side of a motorway

CARTO-NET

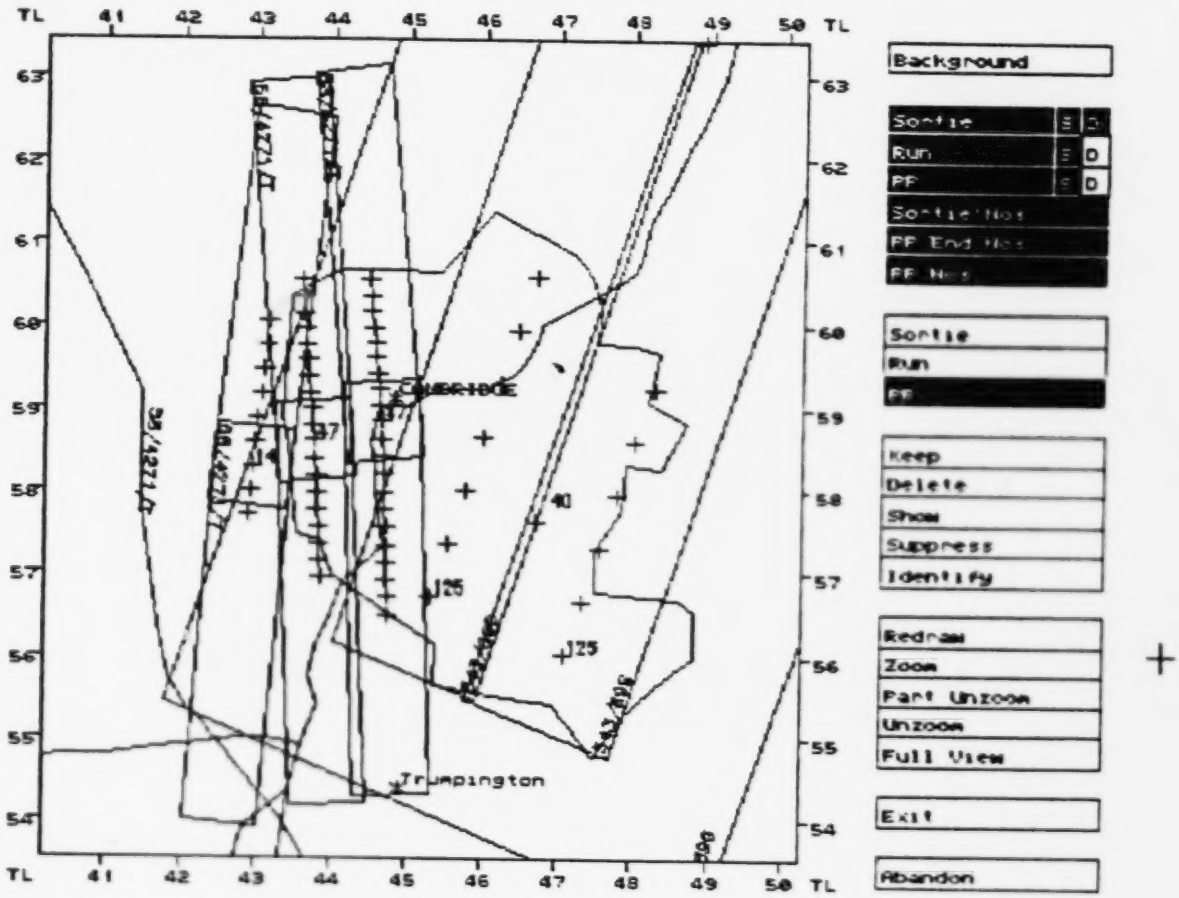

Figure 9 Graphic on-screen re-selection of air photographs

CARTO-NET